

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application.

COMPLETE LISTING OF CLAIMS:

Claims 1-7 : (Canceled)

Claim 8 : (New) A multilayer observation optical microscope,
comprising:

- a) a light source;
- b) an objective lens for focusing an irradiation light beam from the light source into a sample;
- c) a pair of convergence/collimation lenses placed on an optical axis along which the irradiation light beam from the light source enters into the objective lens; and
- d) phase varying means arranged between the convergence/collimation lenses for varying a phase of a transmitting light beam in a given area on a plane traversing the optical axis so as to stepwise adjust a depth of an observation plane of the objective lens.

Claim 9 : (New) The multilayer observation optical microscope according to claim 8; and further comprising a confocal scanner arranged between the light source and the pair of convergence/collimation lenses, the confocal scanner including a microlens array disc disposed on a side of the light source, a Nipkow disc having plural pinholes and disposed on a side of the convergence/collimation lenses in such a manner that it is arranged coaxially and oppositely with the microlens array disc, and a dichroic mirror arranged between the microlens array disc and

the Nipkow disc for transmitting the irradiation light beam from the light source while reflecting fluorescence returned from the sample.

Claim 10 : (New) The multilayer observation optical microscope according to claim 8, wherein the phase varying means comprises a rotating disc having plural phase segments thereon, the respective phase plate segments having different optical characteristics and being arranged for sequentially traversing the optical axis.

Claim 11 : (New) The multilayer observation optical microscope according to claim 10, wherein the respective phase plate segments of the phase varying means comprise isotropic transparent films of different thickness so as to effect the different optical characteristics thereof.

Claim 12 : (New) The multilayer observation optical microscope according to claim 10, wherein the respective phase plate segments of the phase varying means comprise isotropic transparent films having different refractive index so as to effect the different optical characteristics thereof.

Claim 13 : (New) The multilayer observation optical microscope according to claim 8, wherein two-dimensional scanning on a sample stage of the optical microscope and phase scanning with the phase varying means are synchronized with each other so as to enable a three-dimensional dynamic state of the sample to be observed.

Claim 14 : (New) A multilayer observation unit adapted to be assembled in an optical microscope, comprising:

a) a rotating disc having plural phase plate segments thereon, the respective phase plate segments having optical characteristics stepwise different from each other and being adjacently arranged in a circumferential direction, and

b) the multilayer observation unit being arranged between a pair of convergence/collimating lenses placed on an optical axis of a light beam incident on an objective lens in such a manner that a phase of a light beam transmitting through the respective phase plate segments is varied in a given area on a plane traversing the optical axis when the phase plate segments sequentially traverse the optical axis between the lenses so as to stepwise adjust a depth of an observation plane of the objective lens.